KARAYA GUM

Prepared at the 33rd JECFA (1988), published in FNP 38 (1988) and in FNP 52 (1992). Metals and arsenic specifications revised at the 57th JECFA (2001). An ADI 'not specified' was established at the 33rd JECFA (1988).

SYNONYMS Karaya, gum karaya, *Sterculia*, gum *sterculia*, Kadaya, Katilo, Kullo, Kuterra; INS No. 416

DEFINITION A dried exudation from the stems and branches of *Sterculia urens* Roxburgh and other species of *Sterculia* (Fam. *Sterculiaceae*) or from *Cochlospermum gossypium* A.P. De Candolle or other species of *Cochlospermum* (Fam. *Bixaceae*); consists mainly of high molecular-weight acetylated polysaccharides, which on hydrolysis yield galactose, rhamnose, and galacturonic acid, together with minor amounts of glucuronic acid.

C.A.S. number 9000-36-6

DESCRIPTION Unground product: occurs in tears of variable size and in broken irregular pieces having a characteristic semi-crystalline appearance; pale yellow to pinkish brown; translucent and horny
Powdered product: pale grey to pinkish brown; a distinctive odour of acetic acid. Items of commerce may contain extraneous materials such as pieces of bark which must be removed before use in food.
Unground samples should be powdered to pass a standard ISO sieve of 355 µm (USA No. 45) and mixed well before performing any of the following tests.

FUNCTIONAL USES Emulsifier, stabilizer, thickening agent

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4) 2 g added to 50 ml of water swells to form a granular, stiff, slightly opalescent gel which is acid to litmus; insoluble in ethanol

Swelling by ethanol solution Karaya gum swells in 60% ethanol distinguishing it from other Gums

Colour reaction Boil 1 g of the sample with 20 ml of water until a mucilage is formed. Add 5 ml of hydrochloric acid and boil the mixture for 5 min. A permanent red or pink colour develops.

Warm 0.5 g of the sample with 2 ml of 5 M sodium hydroxide; a brown colour is produced.

Precipitate formation Shake 1 g of the sample with 80 ml of water for 24 h. Boil 4 ml of the resulting mucilage with 0.5 ml of concentrated hydrochloric acid, add 1 ml of 5 M sodium hydroxide and filter. To the filtrate add 3 ml of potassium

cupric tartrate solution and heat. A red precipitate is formed.

Gum constituents — Proceed as directed under *Gum Constituents Identification* using the following as reference standards: galactose, rhamnose, galacturonic acid, glucuronic acid, mannose, arabinose and xylose. Galactose, rhamnose galacturonic acid, and glucuronic acid should be present and mannose, arabinose and xylose should be absent.

PURITY

Loss on drying (Vol. 4) — Not more than 20% (105°, 5 h)

Total ash (Vol. 4) — Not more than 8%

Acid insoluble ash — Not more than 1%
Weigh 3 g of the sample to the nearest 0.1 mg in a tared crucible. Ignite at a low temperature (about 550°), not to exceed a very dull redness, until free from carbon, cool in a desiccator, and weigh. If a carbon-free ash is not obtained, wet the charred mass with hot water, collect the insoluble residue on an ashless filter paper, and ignite, in the crucible, the residue and filter paper until the ash is white or nearly so. Add the filtrate, evaporate it to dryness, and heat the whole to a dull redness. If a carbon-free ash is still not obtained, cool the crucible, add 15 ml of ethanol, break up the ash with a glass rod, burn off the ethanol, again heat the whole to a dull redness and cool. Boil this ash with 25 ml of dilute hydrochloric acid TS for 5 min. Collect the insoluble matter on a tared Gooch crucible or ashless filter, wash with hot water, ignite, cool and weigh. Calculate the percentage of acid-insoluble ash from the weight of the sample.

Acid insoluble matter — Not more than 3%
Weigh about 5 g of the sample, to the nearest 0.1 mg and transfer into a 250 ml beaker or Erlenmeyer containing 100 ml of 5% weight/volume hydrochloric acid. Cover with a watch glass or attach the flask to a condenser having cold water running through it. Boil gently until the gum is completely dissolved (about 3 h). Filter the solution through a tared porcelain or glass fritted crucible 10 to 20 µm porosity. Wash the residue several times with hot water until the washings are free from acid (pH paper). Dry the crucible to constant weight at 105°, cool to room temperature in a desiccator and weigh. Calculate as percentage.

Volatile acid — Not less than 10%, calculated as acetic acid.
To 1 g contained in a 700 ml long necked flash add 100 ml of water and 5 ml of syrupy orthophosphoric acid, allow to stand for several h., or until the gum is completely swollen, and boil gently for two h. under a reflux condenser; steam-distil until 800 ml of distillate is obtained and the acid residue measures about 20 ml, and titrate the distillate with 0.1 M sodium hydroxide using phenolphthalein TS as indicator. Repeat the procedure without gum. The difference between the titrations represents the amount of alkali required to neutralise the volatile acid. Each ml of 0.1 M sodium hydroxide is equivalent to 0.00600 g of volatile acid, calculated as acetic acid.

Starch — Not detectable
To a 1 in 10 solution of the sample add a few drops of iodine TS. No blue

	colour should be produced
Microbiological criteria (Vol. 4)	*Salmonella* spp.: Negative in 1 g *E. coli*: Negative in 1 g
Lead (Vol. 4)	Not more than 2 mg/kg Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”